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1. Introduction

The Application Generator is designed to let users of ScanPal 2 Portable Data Terminal to define their own data collection templates quickly and easily on a PC without writing any program code. The user is presented with a terminal Window screen on the PC to simulate the program's running sequences on the actual terminal. A new application can be designed on-screen in minutes, downloaded to the terminal and data collection can commence immediately.

2. How to use the Application Generator

Click right button on the presented window or click left button on the POWER key. The main menu will then be brought up.

3. Main Menu

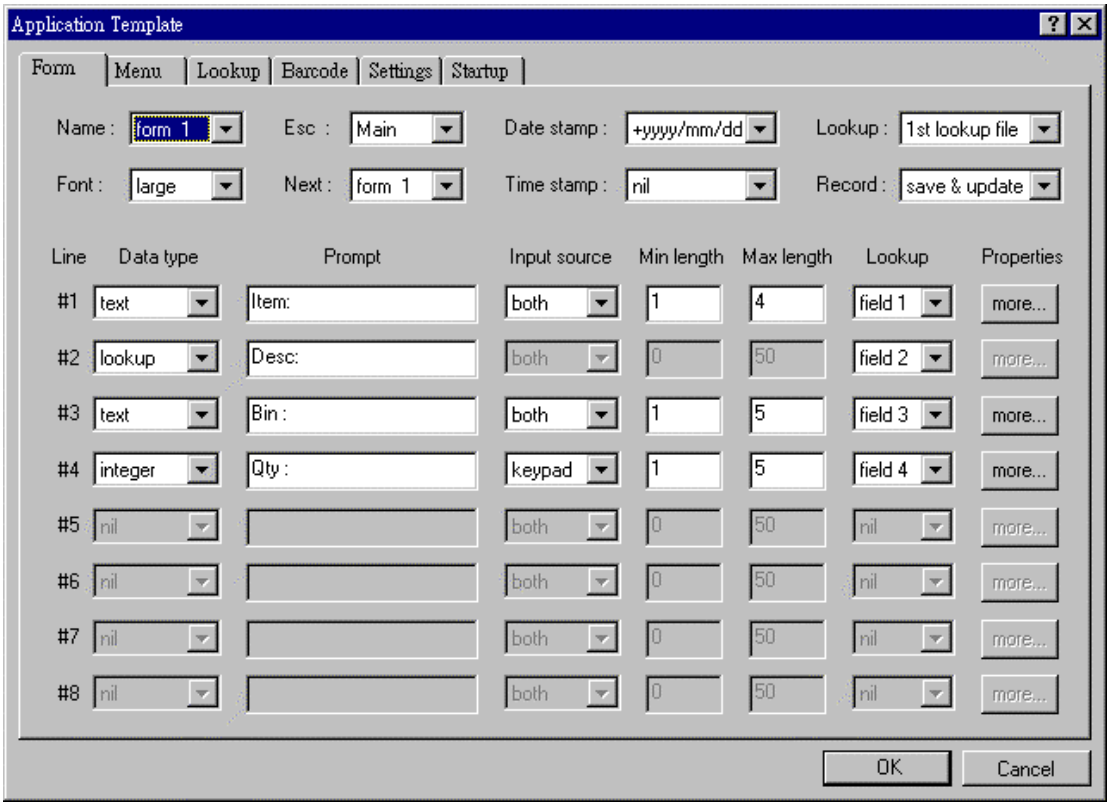
The main menu contains the following commands,

- **New:** To create a new application template.
- **Open:** To open an application template file.
- **Save:** Save current editing template to the file.
- **Save As:** Save current editing template to a new file.
- **Edit:** To edit the current application template.
- **COM port:** To configure the COM port settings for communication.
- **Download program:** Download the current application template to terminal.
- **Download lookup file:** Download lookup file(s) to terminal.
- **Receive data:** Receive data from the terminal.
- **About:** Show information about the Application Generator.
- **Exit:** To close the Application Generator.

A template is composed of Forms, Menus, Lookup files, Barcode settings, System settings and Startup configuration. The user can also specify the format of each transaction record for the terminal.

4. FORM

A form is a data collection template with input prompts. All data will be saved in a transaction file automatically after user completes the input of a form. The length and data type for each input field can be specified. Each form can have up to 8 input fields. The maximum data length for each field is 50 characters. Totally up to 10 different forms can be defined.



4.1 Properties of a form

The properties of a Form are as follows,

4.1.1. Font

Specify the font size to be used in this form. Up to 20x8 characters can be shown on the display for small font, and 15x4 characters for large font.

4.1.2. Esc

Specify what will be shown if the user hits the ESC key.

4.1.3. Next

Specify what will be shown after the user completes the data input of current form.

4.1.4. Date stamp

Choose the format of the date stamp to be added to the transaction record. If the format start with a '+', then the date stamp will be appended to the record; on the contrary, if the format end with a '+', then the date stamp will be placed in front of the record.

4.1.5. Time stamp

Choose the format of the time stamp to be added to the transaction record. If the format start with a '+', then the time stamp will be appended to the record; on the contrary, if the format end with a '+', then the time stamp will be placed in front of the record.

4.1.6. Lookup:

Specify the lookup file to be used by this form.

4.1.7. Record:

Specify how to process the input data.

- **Save:** Save the data as a transaction record.
- **Update lookup:** If a lookup file is used by this form, the user can choose to update the lookup file with the input data.
- **Save & Update:** Not only save the data as a transaction record, but also update the current used lookup file.

- **Pass down:** Do not save the data, just pass it down to the next form or menu.
- **Output record:** Instead of saving the data, output the collected data directly.
- **Output screen:** Output the whole screen, including the prompts and the collected data.

4.2 Properties for each field of a form

The properties for each field of a form are as follows,

4.2.1. Data type

- **Nil:** Not to be used. No prompt, no input field at all.
- **Text:** Any character (eg. $1a2b3c+-*/...)
- **Integer:** Integer number (eg. 123)
- **Real:** Real number (eg. 4.56)
- **Letter:** Alphabet only (A to Z)
- **Fix:** No input field, only the prompting string will be saved in the transaction data.
- **Prompt:** No input field, and the prompting string will not be saved.
- **Lookup:** The input will come from the specified lookup field whenever the data of one input field matches the key field in the lookup record of the lookup file. Unlike the other types (text, integer, real, and letter), the data of lookup type can not be changed by the user.
- **Extension:** Use the same data type as previous line, but can not have any prompts. The maximum data length is determine by the maximum data length of previous field deducts previous field's prompt length.
- **Boolean:** Only accepts '0' / '1' or 'Y' / 'N' input.
- **Counter:** Show the record counts.

4.2.2. Prompt

Specify the prompting string for each input field.

4.2.3. Input

Specify the source from which data is input, can be either scanner or Keypad, or both.

4.2.4. Min length

The minimum required length for the data entered.

4.2.5. Max length

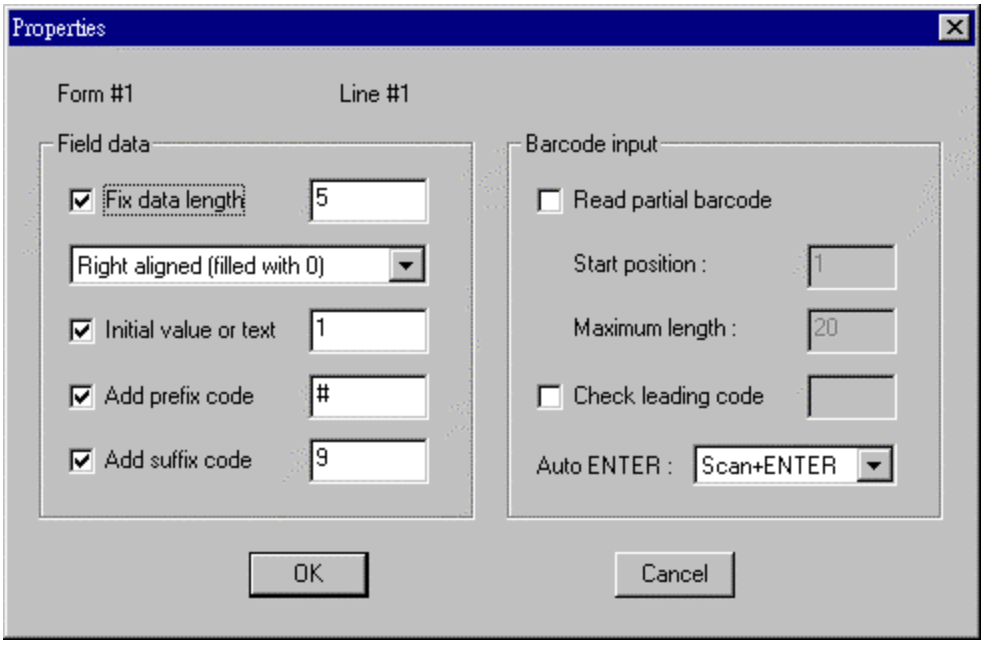
The maximum acceptable length for the data entered. If the maximum length is longer than the field length, the entered data will scroll to the left or move to next field if the data type of the next field is EXTENSION. The maximum length can be up to 50.

4.2.6. Lookup

Specify the lookup field to be referred to. If the specified lookup field is the key field of a lookup file, all input fields that refer to a lookup field will be filled with the lookup data once this input data matches the data of the key field. Note that a referred lookup field prefixed with '+' means any updated data for that lookup field will be added to the original lookup data; and a referred lookup field prefixed with '-' means any updated data for that lookup field will be subtracted from the original lookup data.

4.2.7. More properties

- **Fix Data length:** Specify data length of the input field. If the checkbox is checked, then the data length will be fixed to this value, i.e., if the data entered is longer than this value, it will be truncated; if less than this value, spaces (or 0's) will be added in front of or end of the transaction data depending on the "Left" or "Right" alignment. If the checkbox is unchecked, the data length of this field is free, i.e., it depends on the length of the data entered (between minimum length and maximum length specified for this input field). Initial value or text allows you to assign an initial value or text for this input field.
- **Add prefix code:** Adds a prefix code to the data entered. The prefix code can be any text (eg. "ABC[;123+-"] or ASCII values that separated by space (eg. 35 42" is equal to "#*").
- **Add suffix code:** Adds a suffix code to the data entered. The suffix code can be any text (eg. "ABC[;123+-"] or ASCII values that separated by space (eg. "35 42" is equal to "#*").
- **Bar code length:** Specify the valid length of the barcode. The default starting position of each barcode is 1, and the maximum length is 20.
- **Check leading code:** The leading code check allows you to verify the bar code input. If the leading code is not matched, the input barcode will be rejected.
- **Auto ENTER:** The auto ENTER means whenever a bar code is read, a carriage return will be appended to (Scan + ENTER) or added before (ENTER + Scan) the data so the user need not to press the ENTER key to move to the next field.



Examples of.....

1. Fixed data length

Value + Settings	Scanned Bar code	Transaction data
4 + Left-aligned (padded with space)	**1234**56789	1234,
4 + Right-aligned (padded with space)	12345**6789**	6789,
10 + Left-aligned (padded with space)	7654321	7654321___
10 + Right-aligned (filled with 0)	7654321	0007654321

2. Barcode Input

- **Read partial barcode (for all barcode types)**

Start Position	Max Length	Scanned Bar code	Transaction data
3	10	12**3456789**	3456789
3	2	12**34**56789	34

- **Check Leading Code**

Leading Code	Scanned Bar code	Transaction data
1	123456789	123456789
5	123456789	(ScanPal2 will not accept this code)

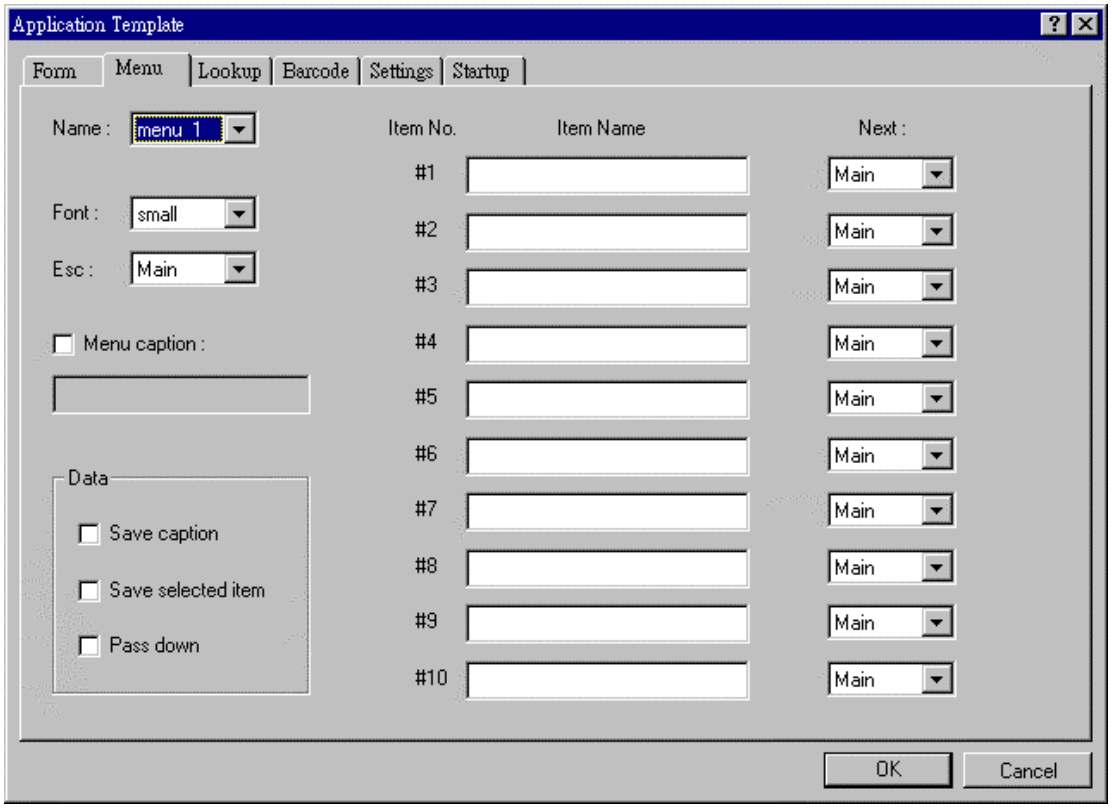
- **Read partial bar code + Check Leading Code**

Start P.	Max L.	Leading Code	Scanned Bar code	Transaction data
3	10	3	12**3456789**	3456789
3	10	1	123456789	(SP2 won't accept this code)

If the start position is the e.g. 3rd Character the leading code digit will be also the 3rd character of the bar code.

5. MENU

A menu is a list of selection items. The user can define up to 10 different menus. Below are the specifications for each field of a menu,

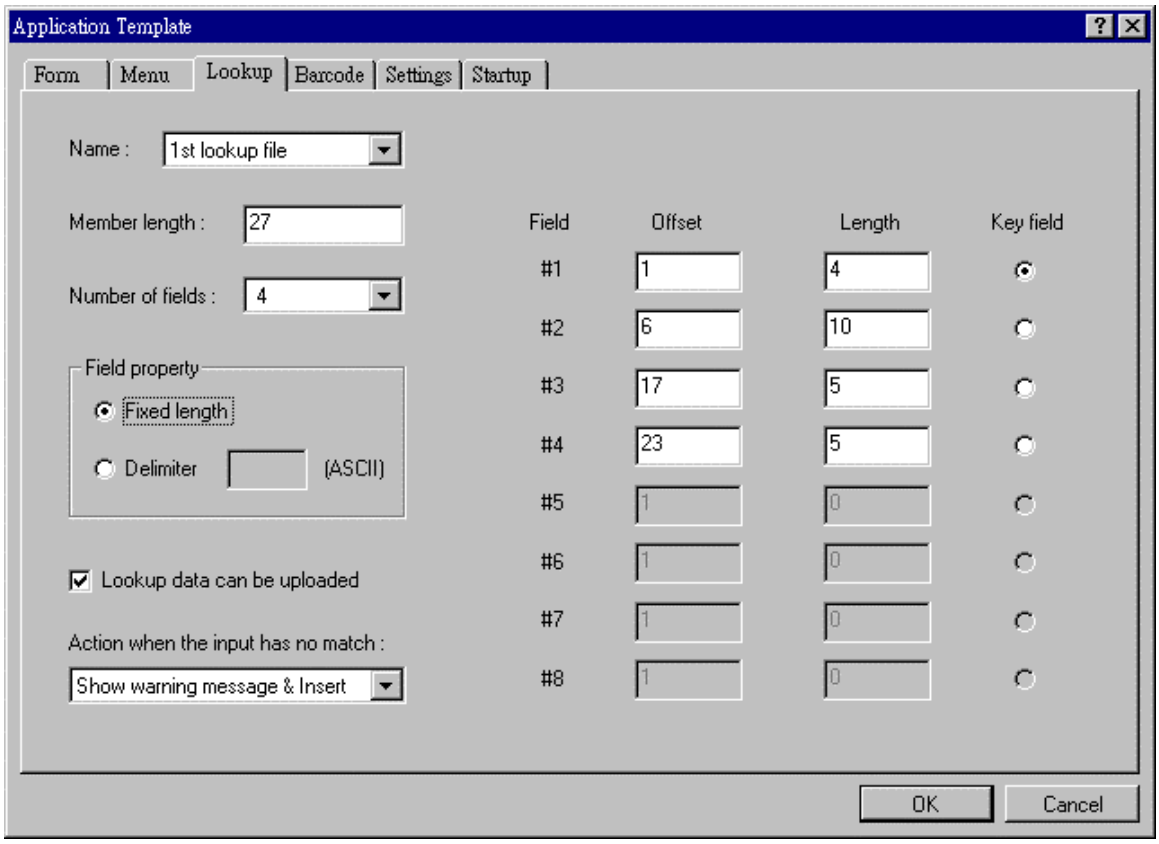


5.1. Specifications for each field of a menu

- **Name:** Select a name (menu ID) for the current menu.
- **Prompt:** Specify the caption for the current menu. This is optional.
- **Esc:** Specify what will be brought up if the user hits the ESC key.
- **Font size:** Specify the font size to be used in this menu.
- **Item Name:** Specify the name of each item for the menu.
- **Next:** Specify what will be brought up after selecting the current item.
- **Data:**
  - **Save prompt:** Save the menu caption in transaction data if the menu item is used.
  - **Save selected item:** Save selected menu item in transaction data if the menu is used.
  - **Pass to next:** Do not save the above data, just pass it to the next menu or form.

6. LOOKUP

A lookup file is a database file created for information reference. Up to three lookup files can be created. A lookup file includes the following properties,



6.1. Member length & Number of fields

Specify the maximum record length and the number of fields for the database file to be created.

6.2. Offset & Length

Define the data offset (the start position) and length for each field.

6.3. Field property

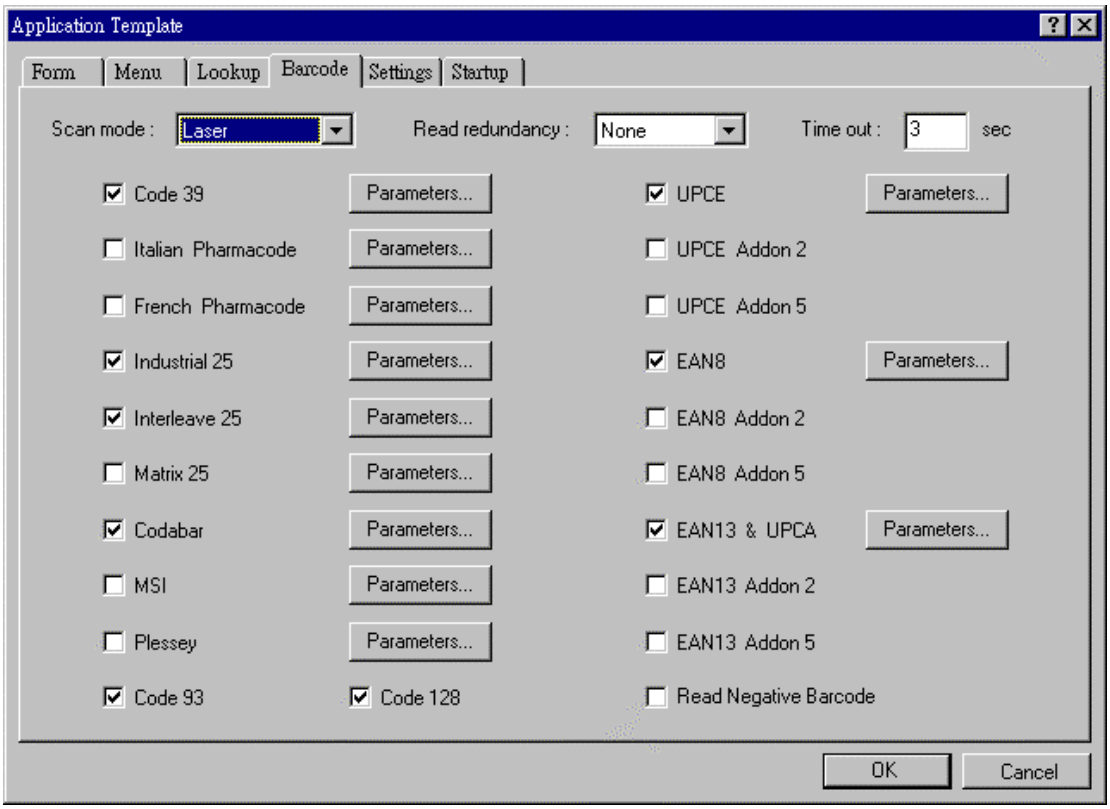
Specify whether the data field is fixed length or delimited. If it is delimited, then you need to specify the delimiter with an ASCII code

6.4. Key field

Select the key field for creating index file of the database. If an input field refers to a key field, then the data in the other referred field will be shown once the entered data match with the key field data.

7. BAR CODE

This section describes user configurable parameters that are pertaining to bar code symbologies.



7.1. Symbology and its parameters

7.1.1. Code39

- **Standard / Full ASCII Code 39** : User can choose to read either Standard Code 39 or Full ASCII Code 39 by configuring this parameter.
- **Start/Stop Transmission** : This parameter specifies whether the start/stop characters of Code 39 are included in the data being transmitted.
- **Checksum Verification** : This parameter specifies whether the scanner will perform checksum verification when decoding barcodes. If the checksum is incorrect, the barcode will not be read.
- **Checksum Transmission** : This parameter specifies whether the checksum character are included in the data being transmitted.

7.1.2. Italy / French Pharmacode

For Italy /French Pharmacode, there is always a checksum character included in the barcode. So the checksum verification is always performed when decoding these symbologies. User though can choose whether the checksum character is to be transmitted or not. The start / stop transmission of this code shares the same setting of Code 39.

- **Checksum Transmission** : This parameter specifies whether the checksum character are included in the data being transmitted.

7.1.3. Industrial / Interleave / Matrix 25

- **Start / Stop Selection** : This parameter provides the readability of all 2 of 5 symbology variants. For example, flight tickets actually use an Industrial 25 barcode but with Interleave 25 start / stop. In order to read this barcode, the **start / stop selection** parameter of Industrial 25 should set to '**Interleave 25'**.
- **Checksum Verification** : This parameter specifies whether the scanner will perform checksum verification when decoding barcodes. If the checksum is incorrect, the barcode will not be read.
- **Checksum Transmission** : This parameter specifies whether the checksum character are included in the data being transmitted.
- **Code Length Qualification** : Because of the weak structure of the 2 of 5 codes, a partial scan has a high probability of decoding as a valid but shorter 2 of 5 codes (known as short scan). To prevent this kind of undesired reading, the **Code Length** settings can help to insure that the correct code is read by qualifying the allowable code length. Code length parameters can be configured in two ways: **Fixed Code Length** or **Max / Min code length**. If the fixed code length is selected, up to 2 fixed lengths can be specified. And if max / min code length is selected, the max length and the min length must be specified, and the scanner will only accept those codes with lengths fall between max / min length specified.
- **Read Odd Number of Digits** : This parameter is available only to the Interleave 25. This parameter must be enabled in order to read Interleave 25 labels that contain odd number of digits.

7.1.4. Codabar

- **Start/Stop Transmission** : This parameter specifies whether the start/stop characters of Codabar are included in the data being transmitted.

- **Start / Stop Selection** : Four different start / stop pairs can be selected as start / stop characters as listed below.
  abcd / abcd
  abcd / tn*e
  ABCD / ABCD
  ABCD / TN*E
- **CLSI Conversion** : If this parameter is enabled, the scanner will perform the CLSI conversion when a 14 digits Codabar barcode is read.

7.1.5. UPCE

- **System Number Selection** : The UPCE comes with 2 flavors : S**ystem Number 0** and S**ystem Number 1**. These two differ in the way data are encoded. The system number 1 is the new UPCE extension to the ordinary UPCE (system number 0). User can have the choice of enabling both system numbers or just system number 0.
  Warning : Because of the way system number 1 is encoded, if both system numbers are enabled, user might suffer from short scanning UPCA or EAN13 into UPCE system number 1 barcodes.
- **Convert to UPCA** : If this parameter is enabled, the UPCE read will be expanded into UPCA, and the following processing will follow the parameters configured for UPCA.
- **System Number Transmission** : If this parameter is enabled, the system number will be included in the data being transmitted.
- **Checksum Transmission** : If this parameter is enabled, the checksum character will be included in the data being transmitted.

7.1.6. EAN8

- **Convert to EAN13** : If this parameter is enabled, the EAN8 read will be expanded into EAN13, and the following processing will follow the parameters configured for EAN13.
- **Checksum Transmission** : If this parameter is enabled, the checksum character will be included in the data being transmitted.

7.1.7. UPCA

- **Convert to EAN13** : If this parameter is enabled, the UPCA read will be expanded into EAN13, and the following processing will follow the parameters configured for EAN13.
- **System Number Transmission** : If this parameter is enabled, the system number will be included in the data being transmitted.

- **Checksum Transmission** : If this parameter is enabled, the checksum character will be included in the data being transmitted.

7.1.8. EAN13

- **ISBN / ISSN Conversion** : If these parameters are enabled, the scanner will convert the code read into ISBN or ISSN code if the formats are correct (EAN13 codes start with 978 or 979 for ISBN, and 977 for ISSN).
- **Checksum Transmission** : If this parameter is enabled, the checksum character will be included in the data being transmitted.

7.1.9. MSI

- **Checksum Verification** : Three kinds of checksum calculations can be implemented into MSI code : **Single Modulo 10**, **Double Modulo 10**, or **Modulo 11 & 10** checksum. If the checksum character is incorrect, the barcode will not be read.
- **Checksum Transmission** : User can control how the checksum is transmitted by configuring this parameters.
  1) Transmitted
  2) Last digit not transmitted
  3) Last 2 digits not transmitted
- **Code Length Qualification** : Because of the weak structure of the MSI code, a partial scan has a high probability of decoding as a valid but shorter MSI codes (known as short scan). To prevent this kind of undesired readings, the Code Length settings can help to ensure that the correct code is read by qualifying the allowable code length. Code length limitations can be set in 2 ways: **Fixed Code Length** and **Max / Min code length**. If the fixed code length is selected, up to 2 fixed lengths can be specified. And if max / min code length is selected, the max length and the min length must be specified, and the scanner will only accept those codes with lengths fall between max / min length specified.

7.1.10. Plessey

- **Convert to UK Plessey** : If this parameter is enabled, the scanner will change each occurrence of the character 'A' into character 'X' in the code.
- **Checksum Transmission** : If this parameter is enabled, the checksum characters (two characters) will be transmitted together with data.

7.2. Scan Mode

There are eight scan modes supported by the CCD scanner. User can choose the desired scan mode depending on the application requirements. But, if the scanner is a switch-less scanner, only Continuous mode or Testing mode can be selected (other scan modes involve trigger switch interaction). The supported scan modes are described below.

- **Auto Off Mode :** The scanner will start scanning once the switch is triggered. The scanning continues until either a barcode is read or a preset scanning period (*Scanner Time-Out Duration*) is expired.
- **Continuous Mode :** The scanner is always scanning.
- **Auto Power Off Mode :** The scanner will start scanning once the switch is triggered. The scanning continues until a preset scanning period (*Scanner Time-Out Duration*) is expired. Unlike the Auto Off mode, the scanner will continue to scan and the scanning period is re-counted each time there is a successful read.
- **Alternate Mode :** The scanner will start scanning once the switch is triggered. The scanner will continue scanning until the switch is triggered again.
- **Momentary Mode :** The scanner will be scanning as long as the switch is depressed.
- **Repeat Mode :** The scanner is always scanning just like Continuous Mode. But now the switch acts like a "re-transmit button". If the switch is triggered within 1 second after a good read, the same data will be transmit again without actually reading the barcode. This "re-transmit button" can be triggered as many times as user desired, as long as the time between each triggering does not exceed 1 second. This scan mode is most useful when the same barcode is to be read many times.
- **Laser Mode :** This is the scan mode most often used on laser scanners. The scanner will start scanning once the switch is pressed. The scanning continues until either a barcode is read, the switch is released or a preset scanning period (*Scanner Time-Out Duration*) is expired.
- **Test Mode :** The scanner is always scanning. The scanner will decode repeatedly even with the same barcode.
- **Aiming Mode :** By selecting this mode, user needs to trigger twice for a decoding. That is, the first trigger is for aiming only, while the second trigger will truly start to decode. After first trigger, the scanner will keep on scanning for one second so that user may take aim. But

user must press the second trigger within this period (default to one second), otherwise it will be reset and user has to take aim again. This mode is used when two consecutive bar codes are printed too closed that users need to take aim and make sure they don't read the wrong barcode. There is a system global variable *AIMING_TIMEOUT* that can be used to change the default one-second time-out duration. The unit for this variable is 5ms.

7.3. Read Redundancy

This parameter is used to specify the levels of reading (decoding) security. If *No Redundancy* is selected, only one successful decoding can make the reading valid. If *Three Times Redundancy* is selected, it will take 3 successful decodes to make the reading valid. It is obvious that the more redundancy the user selects, the higher the reading security and thus the slower the reading speed. The user must compromise between decoding security and decoding speed if the security feature is needed.

7.4. Time out

This parameter is used to limit the maximum scanning period when the scan mode is either *Auto Off Mode* or *Auto Power Off Mode*. This time-out duration is specified in units of second. The default time-out duration is ten seconds.

7.5. Read Negative Barcode

The CCD scanner can be configured to read negative barcodes. Normally, barcodes are printed with the color of the bars darker than that of the spaces. But for negative barcodes, they are printed in the opposite sense just like negative films. The spaces of the negative barcodes are printed with a color darker than that of the bars.

7.6. Supported Symbologies

Most of the popular barcode symbologies are supported. Each symbology can be individually enabled or disabled. The scanner will automatically discriminate and recognize all the symbologies that are enabled. The supported barcode symbologies are listed below.

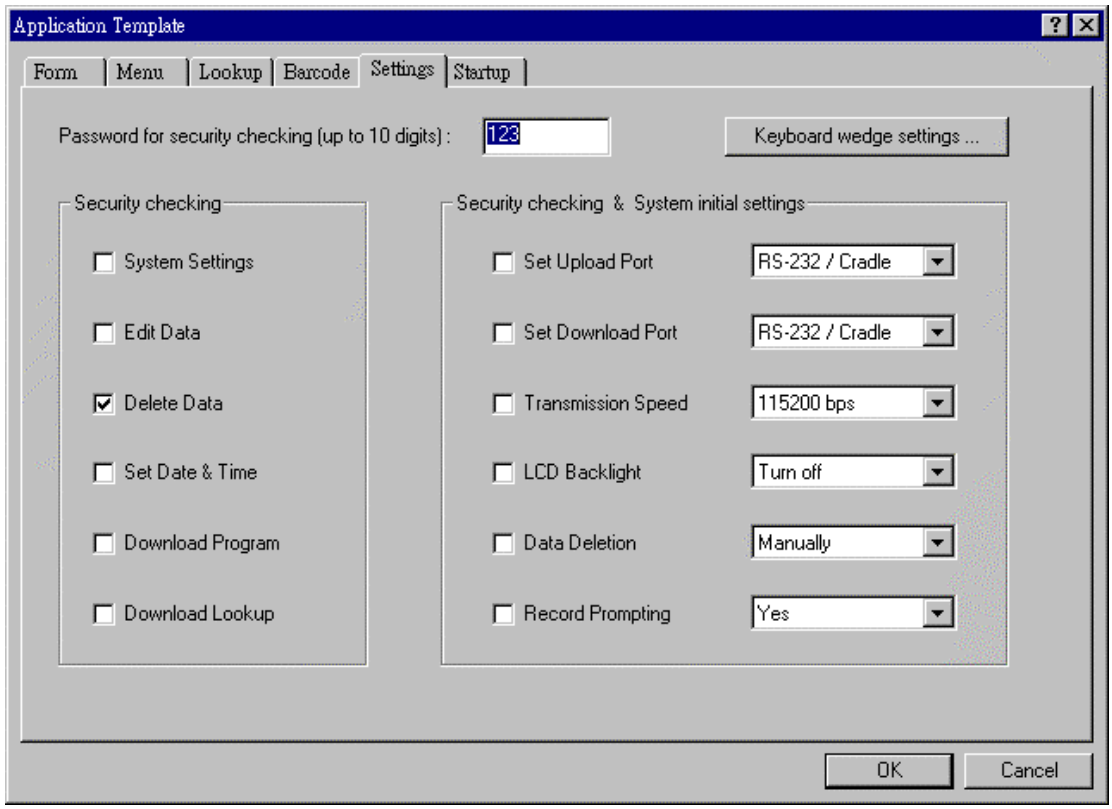
- Code 39 (Standard / Full ASCII)
- Italy Pharmacode
- French Pharmacode

- Industrial 25
- Interleave 25
- Matrix 25
- Codabar (NW-7)
- UPCA (with or without Addon)
- UPCE (with or without Addon)
- EAN8 (with or without Addon)
- EAN13 (with or without Addon)
- Code 93
- Code 128
- EAN 128
- MSI
- Plessey

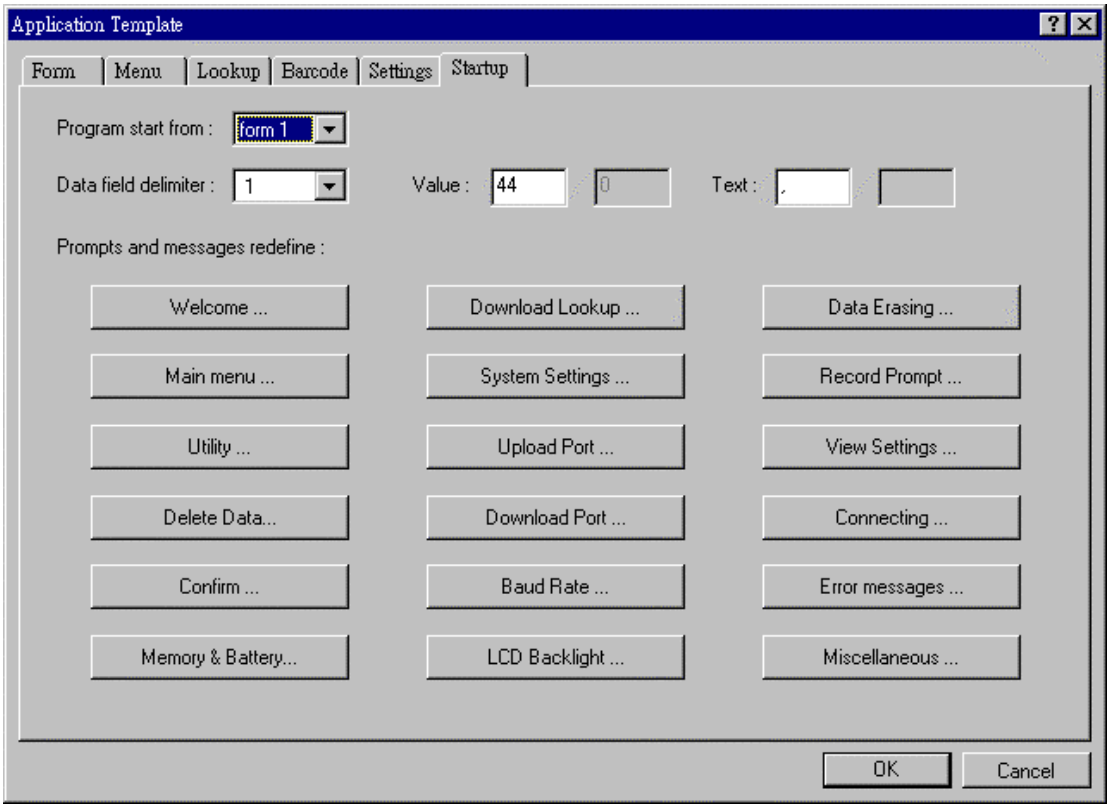
8. SETTINGS

The system settings include the following:

- Define a password (up to 10 digits) for security checking.
- Enable / disable security checking for system utilities and settings.
- Configure the system settings.
- Configure the settings for keyboard wedge interface.



9. STARTUP



9.1. Program start from

Specify which to be executed first when the program start to run.

9.2. Data field delimiter

Specify the delimiters for the data fields. The delimiter can have up to two characters. You can type in the characters of the delimiters or specify them with ASCII codes.

9.3. Redefine system prompts and messages

All the prompts and messages used in the application generator can be redefined by the user's local language. However, only English letters can be used in current system.

10. Utilities

There are two utilities included in the ScanPal 2 Application Generator packet.

10.1. 232_Read

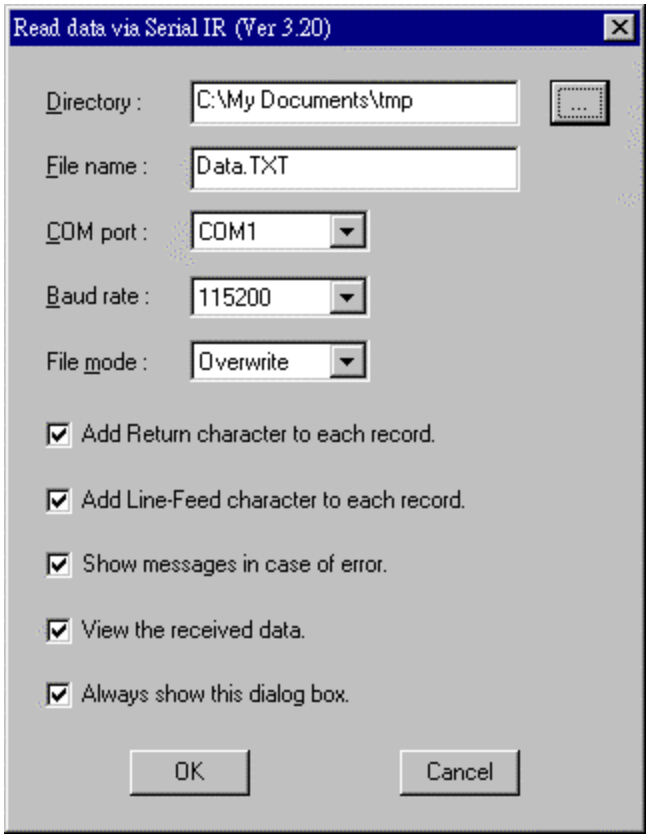
To receive transaction data from ScanPal 2 via RS-232 port. The optional command line arguments are [filename],[COM port],[Baud rate],[File mode],[Add Return], [Add Line-Feed],[Show Error], and [View Data]

- **COM port**: can be 1 to 6
- **Baud rate:**
  - 1 -- 115200 bps
  - 2 -- 57600 bps
  - 3 -- 38400 bps
  - 4 -- 19200 bps
  - 5 -- 9600 bps
- **File mode:**
  - 1 -- overwrite
  - 2 -- append
  - 3 -- new name
- **Add Return:**
  - 1 -- add Return character to each record
  - 0 -- do not add Return character
- **Line-Feed:**
  - 1 -- add Line-Feed character to each record
  - 0 -- do not add Line-Feed character
- **Show Error:**
  - 1 -- show messages in case of error
  - 0 -- do not show error message
- **View Data:**
  - 1 -- view the received data
  - 0 -- do not view the received data

- **For example,**
  - **232_read data.txt,1,1,1,1,1,1,0,0** // filename, COM port, Baud rate and File mode ,CR,LF, error messages ,view data are given
  - **232_read data.txt,1,1,1** // filename, COM port, Baud rate and File mode are given
  - **232_read data.txt,2,2** // filename, COM port, Baud rate
  - **232_read data.txt,3** // filename, COM port
  - **232_read** // select from dialog box

10.2. IR_Read

To receive transaction data from ScanPal 2 via IR Transceiver. The command line arguments and usage are same as 232_READ.EXE.



11. Q&A

(1). **How do I update the kernel program?**

Press "7" "9" and power keys simultaneously to enter the system menu, then turn off the power and press "1" "7" and power keys simultaneously to enter the kernel menu. Select "Update kernel" then download the kernel program from the PC.

(2). **How do I download my user program?**

If you are in the kernel menu, just select "Program download" to download user program (any *.SHX files except the kernel program). If you are in the system menu, select "6. Version" then select "2. Download".

(3). **How do I download my application program created by the generator?**

From the main menu of the terminal, select "3. Utility" and then select "6. Download program". On the PC side, select "Download program" from the menu of the Application Generator. Note the COM port settings for both side should be matched.